

**VERIFYING THE AUTHENTICITY OF PRINTED DOCUMENTS ON
UNIVERSALLY AVAILABLE PAPER STOCK**

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RELATED APPLICATIONS

The present application is a continuation-in-part of copending U.S. Patent Application,
Serial Number 09/324241, ^{filed 6-2-99} entitled "VERIFYING THE AUTHENTICITY OF PRINTED
DOCUMENTS" incorporated by reference herein.

TECHNICAL FIELD

This invention relates to electronic commerce in general and in particular to a system
and method for establishing the authenticity of a past electronic communication at the point of
the consummation of the commercial endeavor which is the subject of the electronic
communication, and more particularly to a system and method for allowing valuable
documents to be printed on universally available paper stock.

BACKGROUND

Electronic commerce is everywhere now. People are using the Internet, as well as other remotely accessible locations, such as kiosks, to order goods and/or services. Some of these services require verification of prior payment and/or reservations at the time the service is being offered which typically is sometime after the actual purchase (or reservation) was made. For example, assume a person desires to reserve a seat on an airplane, or a room in a hotel, or a rental car, or a seat in a theatre, all from a remote terminal. Typically, that person would get into communication contact with a reservation system. This communication can be with a live person at the selling end or could be with a computer acting in an interactive mode or a combination of the two. The reservation would be made and arrangements would be made to pay for the reservation. Then the problem arises; how does the purchaser demonstrate to the gatekeeper at the airline (or to the rental car gatekeeper; or to the theatre usher or the postal delivery service) that the service has been paid for?

The obvious answer is that a ticket, stamp or other indicia of the transaction, is printed at the purchaser's terminal and that printed ticket is used to identify that the services have been paid for. That might work when the paper stock that the receipt information is printed on is closely guarded and very distinctive. It will not work for obvious reasons where general purpose printers and widely available pare stock are used to print the receipt at the purchaser's premises.

In situations where valuable documents such as stamps, travelers' checks and the like, are sold, it is important to keep the unsold stock in a safe place to avoid theft and fraud. Thus, those types of valuable documents are obtainable only at specific limited locations and not universally available for purchase.

If electronic commerce is to flourish then it is mandatory to have an arrangement whereby the purchaser can obtain immediately upon purchase a printed verification of the transaction in a manner which allows for universal printing on universally available stock while

still allowing the printed receipt to act as a final verification of authenticity at the point where the actual services are rendered.

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SUMMARY OF THE INVENTION

These and other objects, features and technical advantages of my invention have been achieved in one embodiment where a system and method is utilized for establishing a commercially available partially preprinted form where the form has printed on it information used by the service seller during the initial transaction communication period for establishing integrity control for subsequent verification. In one embodiment, the form is available to any purchaser for use with any general purpose printer operable in conjunction with a PC or other communication/computing device, including so called "dumb" terminals. This form is advantageously preprinted with both human readable data and machine readable data. As will be seen, the machine readable data, which I will call an indicia, contains key information which serves to help decode material that is subsequently printed on the form under control of the central validating system.

In operation, the purchaser enters into an interaction communication with the seller of the service. This may be, by way of illustration, from the purchaser's PC at his/her home via the Internet to a web site maintained by the seller. The user has obtained one or more preprinted paper forms from a supplier of forms. The weight of the paper is not critical and the forms may be any weight stock. The user inputs the human readable data from the exact preprinted form that the user intends to use. This input can be by verbally reading the data or by scanning the data or by any other system. In situations when there is no human readable material preprinted on the form, the user would scan in the machine readable portion. Some portion of the preprinted data is unique to the exact form selected by the user at that time.

The seller, upon receipt of the unique data from the user pertaining to the selected form, verifies that this exact form identification number has not been previously used. Since each preprinted form has a unique identification code, this initial screening process insures that a copy of the preprinted form is not being used. The seller then uses the unique identification number to establish an encryption code for printing on the form a machine readable security



indicia. It will be this security indicia that will subsequently be used in conjunction with the original preprinted indicia to verify the authenticity of the information to be printed on the form. The seller then sends information to user so that the user's printer will print on the form all of the information that will be used by the purchaser to subsequently obtain the service.

5 The form that is used could be, for example, a sheet of paper divided into sections with a glue backing. The individual sections can be the size of a postage stamp (or other valuable document) and each section can (but need not) have preprinted data thereon. Each section then can be printed with information representing a value and the sections would be separated into individual stamps for use on envelopes.

For verification of the authenticity of each stamp, the original preprinted indicia from the form is read to obtain a decryption key. This key is then used to decrypt information stored in the security indicia that was printed at the time the remainder of the stamp information was printed. If the key is not present on the preprinted form, or if the key differs from the key assigned to that stamp in conjunction with the human readable data that was inputted by the purchaser during the initial payment, then the data on the form will not be verified and the mail will be rejected.

Note that the printer can be any printing device for creating images on paper, or it could be a device for storing images which can later be displayed to obtain the goods and or services. For example, the printer can be part of a vending machine which, prior to each activation, only contains paper having on (or within) it preestablished data unique to that sheet of paper. This paper stock has very little intrinsic value. When a user desires postage (or a money order or any other document), money or credit is used and a sheet of the paper is printed as described above. The printed sheet now becomes a valuable document. In this manner a storekeeper need not maintain a large inventory of valuable stock (such as stamps or money orders) since the value is added only as needed. In the situation with stamps, this invention would reduce, or eliminate, the need for preprinting stamps, since one, two or a sheet of stamps could be printed when needed. Thus, the seller of the stamps (money orders

or other document) need not maintain all of the possible denominations or variations of the documents and only need maintain the relatively valueless paper forms.

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

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BRIEF DESCRIPTION OF THE DRAWING

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawing, in which:

FIGURE 1 shows a sample preprinted blank form:

FIGURE 2 shows the form of FIGURE 1 having created thereon luggage tags and a boarding pass;

FIGURE 3 shows a typical user workstation:

FIGURE 4 shows a typical seller work system;

FIGURE 5 shows a typical point of sale verification system:

FIGURE 6 shows a simple algorithm for authenticating the printed form:

FIGURES 7A-7C show a series of preprinted blank forms:

FIGURES 8A-8D show tickets printed using the blank forms of FIGURES 7A-7C:

FIGURE 9 shows a system and method of this invention arranged in a vending machine configuration and

FIGURE 10 shows the operation for a system and method of this invention for controlling third party printing.

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DETAILED DESCRIPTION

suba 7 Turning now to FIGURE 1, form 10 is the original display media which, in one embodiment, can be ticket stock printed with indicia 16 thereon. Indicia portion 16a can be a machine readable portion of the indicia (which can be, for example a Universal Bar Code, an Intermec Corporations' Code 49, or a Laser Light System Inc.'s Code 16K, or any other type of machine readable code) and portion 16b is a human readable portion. Note that for the purposes of this invention the indicia can be entirely machine readable or entirely human readable, if desired. In addition, the human readable portion could be a different form of the indicia, such as bar codes that can be machine readable. In the embodiment, form 10 is divided into sections 11, 12, 13, 14 and 15 each separable by perforated lines 102, 103, 104. These lines can be traditional perforations, or they can be simple folds. In some situations there need not be any perforations or folds.

suba 7 As will be seen in FIGURE 2 for an airline ticket portion 13 of ticket stock 10 is printed with the necessary boarding information. In such a situation, section 14 would be the passenger's copy of the boarding pass, section 15 would be the passenger's receipt, and sections 11 and 16 would be the luggage tags that would be preprinted. Thus, the luggage tags can be removed from the printer and ticket stubs 13, 14 and 15 can be separated along the perforation lines. Paper on the backing of the ticket stub area (not shown) can be removed to reveal a portion which has a sticky substance thereon which would allow the tags to be placed in the traditional manner on the luggage to form a loop around the handle.

Turning now to FIGURE 3, a user using system 30 who has obtained one or more portions of ticket stock 10 places a ticket form or a series of ticket forms 10 in paper tray 360 of printer 36 which is connected to processor 33, which in turn accepts inputs back and forth between keyboard 32, display 31, scanner 34 and communication control 35. The user then makes communication contact with a seller (FIGURE 4) via communication control 35 and signal link 301. Signal link 301 could be wireless, wireline, or any other combination system. The internet can be used for this purpose or direct phone line connections combinations thereof. In a typical situation, software would be controlled by processor 33 and the user of

keyboard 32 and display 31 would interact with the seller at system 40 FIGURE 4 to arrive at a desired flight, cost, time, seat assignment, return trip or intermediate stops. This would all be accomplished in a well known fashion, either verbally on both parts, or by one or both parties communicating without the intervention of a human on either of both sides. The user at system 30 and the seller at system 40 come to a meeting of the minds with respect to the payment and other terms. The user at 30, either verbally or via scanner 34 (which can be part of printer 36 if desired) reads off the human readable portion of code 16b shown in FIGURE 1.

This data is communicated via link 301 to communication control 41 and processor 42. Processor 42 operates in conjunction with data base 43 and determines whether the code that has just been received from the preprinted form is a valid code. This determination can be based upon several factors, one factor being that the code has never been used before, thereby ensuring that it at least appears to be unique to this form. Also, the verification can determine whether the code number is within an acceptable range for this user. Various other parameters can be checked. In one embodiment, processor 42 working in conjunction with data base 43, would know that the original machine readable indicia on ticket stock 10 portion 16a has contained within it a particular key which had been preassigned prior to the printing of the ticket stock. Processor 42 then utilizes a coding algorithm which is secret to it, but which is based on the key contained in the original printed indicia. Utilizing this information, processor 42 formulates a printed message which is transmitted via communication channel 301 to FIGURE 3 system 30 and via communication control 35 to processor 33 which then controls printer 36 to print the ticket such as is shown in FIGURE 2.

The stock could be preloaded in vending machine 90 (FIGURE 9) and when a user places the proper amount of coins, or uses a credit/debit card or smart card or establishes other credit, (and/or proper identity in some situations) vending machine 90 will initiate contact via communication control 99 with communication control 41 (FIGURE 4) and, as discussed above, images will be formed on the stock. Data which has been prestored on the forms will be communicated to control 41 by scanning or otherwise electronically reading that

data. The data and/or any required security image, can be in any format, including infrared, ultra-violet or fluorescent inks or the like, magnetic inks, magnetic or electronic embedding in the medium, isotope tagging, holographic marking, silicon chip implant, and other systems for storing data. Any of the marking systems can be human readable, machine readable or combinations of the two. Also, the data can be stored in a manner where it verbally communicates to the seller upon being stimulated. In the preferred embodiment, the data to be communicated to the seller is human readable, or bar code readable, while other data or images are embedded on the paper stock for security purposes. This security image can be, for example, any of the above types. Some of the preestablished data could be images which are visible or understandable to humans while other parts of the data can be readable only with special systems.

A separate data base (not shown) could be used to transmit certain data to be used to control the indicia that will ultimately be printed. As shown in FIGURE 9, form supply 91 could hold different forms for different uses, such as postage stamp stock, airline ticket stock, sports ticket stock, or check (postal money order) stock. The number of such form types is unlimited, such as, for example, certified checks, cashier checks, bank drafts, letters of credit, legal documents, legal certificates, diplomas, passports, birth certificates, visas, drivers' licenses, social security cards, insurance cards, travel vouchers, meal vouchers, food stamps, prescriptions (R_x) from doctors, stock, bonds, or any other form that requires hard copy authentication or validation (other than cash) at a point in time other than when the document is created. The type of stock used will be appropriate to the ultimate use, but can contain forms as elaborate as necessary.

The user establishes credit, via input 95, and makes his/her selection via either selector 96 or interactively via keyboard/display 97 (or via telephone 98). The selection will include the name of a payee, theater, airline, sports event or other data appropriate to the selected document type. Once the selection is made, the proper form (or a universal form) is presented to scanner 92 so as to transmit the unique code to the seller's data base (FIGURE 4) as above discussed. Once this is accomplished and a verification of authenticity is made, the form is

available to printer 93 so as to print thereon the images received from the seller (FIGURE 4). Once finished, the now valuable document is dispensed to the user via dispenser 94. Note that if a sheet of stamps is ordered, the user would specify what denomination or denominations if more than one denomination is to be printed on a sheet. When the stamps are printed, they can be used individually as postage.

Note that the printed ticket in FIGURE 2 has a second indicia 21 which is machine readable similar to indicia 16a and decodable only by utilizing the key which is contained in indicia 16a. Indicia 21 has been especially created by processor 42 in FIGURE 4 under control of the previously transmitted data from the buyer and will serve to verify the authenticity of the ticket when the user arrives at the terminal for boarding the airplane, or when the user, in another situation, arrives at a theater. The printed control indicia is compared using the embedded key from the original indicia to decode the printed indicia to authenticate the validity of the ticket. As previously discussed, this can be used for renting cars (or any other transaction) where the actual information is given to the user preprinted ahead of time at the user's location and the printed indicia is used to allow the car to be removed from the lot via the mechanism above described. Note that more than one control indicia, or key indicia, can be printed (or imbedded) on any form.

Turning now to FIGURE 5, when the user arrives at the point of utilization, i.e., the boarding gate of the airline, bus station, train station, or at the exit gate of the rental car agency, or at the entrance to the theater (so that the preprinted commercial transaction is about to be authenticated and the services actually rendered based upon a preestablished commercial transaction between the parties) (or in the case of a stamp, when the mail piece on which the stamp is placed arrives at a mail distribution center), reader 51 reads the information that is on the preprinted ticket (stamp or money order form) including the original indicia 16a and the new indicia 21. Also, if a security image which had been preestablished on the form is expected, that security image will be checked via box 602 (FIGURE 6). This information is provided to processor 52 which then extracts the key from the data contained in indicia 16 for decoding the data in indicia 21, thereby enabling a determination that the passenger is okay to

go, via display 54, or that the ticket is not valid, via display 55. Processor 52 can transmit and receive information via communication control 56 overlink 501 to communication control 41 in FIGURE 4. The purpose of this link can be two fold if desired. 1) When the initial transaction is consummated, processor 42 can operate to transmit the information via link 501 to processor 52 and its database (not shown) indicating that certain information has been printed on various tickets. This would serve as a further backup to the decision process at the time of offering of the services since the indicia that has been printed is expected at that period of time from the information given at the time of the booking. For example, seat information and other information including information pertaining to the printed indicia 21 can be communicated to processor 52 so that when printed indicia 21 is presented, processor 52 can utilize its intelligence to determine the validity of the printed indicia to further check that copies are not made and that the services are not given to the wrong person or to many people utilizing the same numbers.

Sub 9.5 This system cuts down on fraudulent operations and even if an unscrupulous operator were to make copies of a printed ticket, only one such ticket could be processed at processor 52 because the second one would block since it would no longer be valid for transport or for the rendition of services. Thus, the user of the ticket stock would be in no different position than if the user were to obtain a ticket and have somebody steal the ticket and/or copy the ticket, since control indicia 21 would only have been printed upon the consummation of a commercial transaction, which implies that a means of payment had been agreed upon between the parties.

Sub 9.5 Turning now to FIGURE 6, a simple flow chart is shown to show the operation just described and box 601 of the ticket is read and box 602 determines if the format of the entire ticket including indicia 16a and 21 is accurate and proper. In this respect there can be, if desired, interaction between information at the local service rendering position and the central data base box 604. If the format is wrong, the transaction is stopped via box 602. If the format is proper, then the original indicia is read box 603 to determine the key which would be used to decode indicia 21 prior to such utilization of the key. The key is checked via box 605

to determine if it is a valid key. Again this validity check can be done in cooperation with information received from the central data base, if desired, via box 604. If it is a valid key, then the key is used to decode the information from the printed indicia box 606 which provides information to processor 607 which verifies the authenticity of the data on the remainder of the ticket and determines (optional) if the parameters (time, date, sequence, etc.) are correct for the passenger of this receipt box 609. Again this information can be used to update the central processor if desired to maintain central control. Box 610 controls whether the bearer may board or enter the theater or remove a car from the lot or any other commercial transaction controlled by the ticket or other display utilized at the time of the actual rendering of the service or the obtaining of the goods where the goods or services have been paid for in a prior arranged commercial transaction.

Note that while we have been discussing airlines and rental cars and theaters, this same procedure can be used to obtain merchandise at one point in time where the merchandise has been preordered and prepaid for and receipts generated at a home or office at a general purpose printer using special paper stock which has been printed on it (or otherwise associated therewith) a unique identification code. These codes have been used to create a separate indicia which is coded with a decoding being controlled by a key obtained from the originally printed indicia. Also note that while we have been discussing material forms, this system could work just as well with an electronic display device visual or otherwise where certain portions of the data can be electronically coded and subsequently decoded utilizing a key which is contained in the original information.

Sub 90 FIGURE 7A shows blank stock 70 which has been divided into three sections 71, 72, 73 each having printed thereon an indicia 16, which has a machine readable part and a human readable part. Note that the last two digits in our example 02, 07 and 08 are individual to each form with respect to sections 71, 72 and 73 and need not be in sequential order. These individual last digits could signify the actual sheet number of a form 70 or the individual section number. FIGURE 7B has three more sections 74, 75, 76 and FIGURE 7C has an

additional two sections 77, 78. These sections could all be part of one long roll of forms or could be different form sheets with different numbers of blanks thereon.

5 *sub 97* Turning to FIGURE 8, a user having a sheet of blank form 70 inserted in the user's printer may order a series of tickets for different sporting events, theaters, lotteries and the like. The user upon connection to a common server which serves several different such sporting events may order and pay for the tickets which will printed as discussed above. These are shown in FIGURES 8A and 8B.

20 Note that indicia 16 can be printed on the sheet and can include either or both machine readable and human readable sections and also this mark may be presented to the users in various forms, one of which could be watermarks, or, as discussed above, any other type of data storage if checks were to be printed, built into the paper which could be uniquely identified if desired. They would then have printed on them the proper logos and markings for signature by the user when the user utilizes the printed "check" to purchase goods or services. The check would have printed on it the printed indicia as well as the initial indicia so that the acceptor of the travelers check could, if desired, run the check through a scanner or other reading device to determine the authenticity of the check. For postal money orders, or other commercial paper, the payee could be printed on the check, if desired. Note that each sheet (or form) can have a single block of data for the whole form or may have different data bits for each section of the form. When a single data system is used, each section of the form can still have different control codes printed thereon if desired. However, preferentially, each section should have associated therewith a unique preestablished control code.

25 Note also that when a consumer is ordering tickets, the ordering need not be from the same seller but may be from a plurality of sellers. For instance, the user may call for baseball tickets to one seller, football tickets to another and perhaps call for tickets at a distant city. In each case, the seller would utilize the information transmitted by the seller which is unique to the ticket stock currently in the printer. This information would be communicated by the seller's system to a central database to determine what physical position on the ticket stock this particular ticket should be printed and to also determine whether the unique number

identified with this ticket has been previously utilized. Thus, user can have printed at their own printers tickets for many diverse events using this system.

Note also that while in the embodiment, the purchaser transmits the unique data pertaining to the stock material to the seller, a system could be devised whereby the unique information is sent by a third party in response to a trigger supplied by the user. This trigger could be automatically generated by the printer scanning the paper and accessing a remote or local data base, or by the data base keeping track of the user's use of the stock and sending the next number in a sequence. For some users (particularly high volume users) the seller could keep track of the anticipated next number in a sequence of preestablished numbers so that the user need not transmit any information. The unique code on the stock could, for example, be printed at the time of the transaction under control of a source other than the seller.

Also note that where the term ticket is used, I mean any indicia generated as discussed above, which represents a prior transaction, including, by way of example, stamps, checks, money orders, receipts, food stamps and the like, and when the term credit value is used, I mean any valuation at the initial point of user contact with the provider of the service/document and can, for example, include the user's identity, a payee identity, an amount to be printed on a document, a third party identity and/or a user provided code.

While I have been discussing the creation of a valuable document at a user's location where the document stock is under the control of the user who is creating the document based on data preestablished with respect to the document, the system and method of my invention can be used in any number of configurations. By way of example, let us assume that there is created a trusted intermediary who a user has credit with or with whom a user feels comfortable in giving credit card or banking information. This trusted intermediary can be a bank or any business set up to process commercial transactions.

Let us then assume that the user desires to pay for some service or some goods purchased remotely. Such a situation occurs when the user shops on the Internet, or wins a

bid at a bid website or when the user buys goods over the telephone. The problem then arises as to how is the buyer to pay the seller for the goods or services he/she bought? Credit cards come to mind in this situation but many people do not believe that it is sound to practice to distribute their credit information in a relatively open forum. This same problem arises when a person (or organization) attempts to deliver a valuable document, such as a driver's license, owner's title certificate, food stamps, or stock and the like.

Using the principals and concepts of my invention, as shown in FIG 10, the buyer would contact the trusted intermediary (1001), perhaps by Internet, direct electronic connection, telephone or via any other communication vehicle. They buyer would communicate the amount of the transaction, the payee information and/or other pertinent information to the intermediary (1002). The intermediary would then debit the user's account, or otherwise satisfy itself that it will be paid or that the transaction is legitimate. The seller then contacts the website (or otherwise comes into communication contact with the intermediary) of the intermediary (or the intermediary could contact the seller) and identifies itself. The parties then mutually satisfy themselves that the other party is authentic (1003). When the intermediary is satisfied that the seller and the payee are one in the same (or that the proper party is at the destination) the seller installs check paper blank (except for the preestablished data and perhaps a security tag) stock in a printer local to the seller (1004) and the seller then communicates certain information preestablished on the check paper back to the intermediary. The intermediary then causes the seller's printer to print the check with the payee's name on it in the amount specified by the buyer (1005). When the check that is printed at the seller's location is presented to an institution for payment the special data printed on the check is decoded using at least a portion of the originally preestablished data on the then blank document stock (1006). Note that the intermediary and the seller can be connected even before the buyer transmits the information so that the intermediary can cause the seller's printer to print substantially concurrent with the receipt of the information from the buyer. In this manner the intermediary could keep track of the sequence of form usage at the

seller's location, thereby knowing without further communication the preestablished data associated with the next blank form.

While I have discussed a few scenarios many other similar scenarios exist for delivering a valuable document from one person to another in a manner such that the authenticity of the delivered document is ascertainable. For example, this system could be used to deliver car titles from a state registration agent to a dealership, where the title is in the name of the car owner.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present invention. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.